

SEQUENCE LISTING

SEQ ID NO: 1: Nucleotide sequence of 11.5 kb PCR product amplified from chromosomal DNA of *C. jejuni* OH4384 which includes *LOS* biosynthesis locus

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1 aaagaatacg aatttgctaa agaggtttta aatcttagtg gtattgatga aacacatata
61 gaattagcgc caaaatttaa tcttgaagag ctaatggcctt ttacaaaaat gatggatcctt
121 atcataggaa atgatagcgg tccaacacat ttagcttttg ctttaataaa agcatctatt
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SEQ ID NO: 1 (cont'd)

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SEQ ID NO: 1 (cont'd)

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 3961 aaaatataaa aaattaatta atttttaggt ataataccta taattatagg agaaaatatt
 4021 ttatatgcta ttccaatcat actttgtgaa aataatttgc ttattcatcc cttttagaaa
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 4261 atctaaagat ccaaaatctc ctttgaatcc ttgggctttt atcagagtaa aaaatgaagc
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SEQ ID NO: 1 (cont'd)

11221 accatattta aactattatc ttacttttta tcatcgataa tcaaaatttc aatatctttt
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11341 gggattatga tagaaaagttg tggcatattt ttcctaaatt ttgttaaaat aataaaaaaca
11401 attctatcaa agtttaggaa atttatgaaa atttttatc accttccaaç ctggttaggc
11461 gatacgggtaa tggc

SEQ ID NO: 2: Nucleotide sequence that encodes bifunctional sialyltransferase *cstII* from *C. jejuni* strain OH4384 (ORF 7a of *LOS* biosynthesis locus)

ATGAAAAAAG	TTATTATTGC	TGGAAATGGA	CCAAGTTTAA	AAGAAATTGA	50
TTATTCAAGA	CTACCAAATG	ATTTTGATGT	ATTTAGATGT	AATCAATTTT	100
ATTTTGAAGA	TAAATACTAT	CTTGGTAAAA	AATGCAAGGC	AGTATTTTAC	150
AATCCTATTC	TTTTTTTTGA	ACAATACTAC	ACTTTAAAAC	ATTTAATCCA	200
AAATCAAGAA	TATGAGACCG	AACTAATTAT	GTGTTCTAAT	TACAACCAAG	250
CTCATCTAGA	AAATGAAAAT	TTTGTAAGAA	CTTTTTACGA	TTATTTTCCT	300
GATGCTCATT	TGGGATATGA	TTTTTTTCAA	CAACTTAAAG	ATTTTAATGC	350
TTATTTTAAA	TTTCACGAAA	TTTATTTCAA	TCAAAGAATT	ACCTCAGGGG	400
TTTATATGTG	TGCAGTAGCC	ATAGCCCTAG	GATACAAAGA	AATTTATCTT	450
TCGGGAATTG	ATTTTTATCA	AAATGGGTCA	TCTTATGCTT	TTGATACTAA	500
ACAAAAAAT	CTTTTAAAAT	TGGCTCCTAA	TTTTTAAAAT	GATAATTCAC	550
ACTATATCGG	ACATAGTAAA	AATACAGATA	TAAAAGCTTT	AGAATTTCTA	600
GAAAAAACTT	ACAAAATAAA	ACTATATTGC	TTATGTCCTA	ACAGTCTTTT	650
AGCAAAATTT	ATAGAAGTAG	CGCCAAATTT	AAATTCAAAT	TTTATCATAC	700
AAGAAAAAAA	TAACTACACT	AAAGATATAC	TCATACCTTC	TAGTGAGGCT	750
TATGGAAAAAT	TTTCAAAAAA	TATTAATTTT	AAAAAAATAA	AAATTAAAGA	800
AAATATTTAT	TACAAGTTGA	TAAAAGATCT	ATTAAGATTA	CCTAGTGATA	850
TAAAGCATT	TTTCAAAGGA	AAATAA			876

SEQ ID NO: 3: Amino acid sequence of bifunctional sialyltransferase *CstII* from *C. jejuni* strain OH4384 (encoded by ORF 7a of *LOS* biosynthesis locus)

	10	20	30	40	50
1	MKKVIIAGNG	PSLKEIDYSR	LPNDFDVFR	C NQFYFEDKYY	LGKKCKAVFY
51	NPILFFEQYY	TLKHLIQNQE	YETELIMCSN	YNQAHLENEN	FVKTFYDYFP
101	DAHLGYDFFK	QLKDFNAYFK	FHEIYFNQRI	TSGVYMCABA	IALGYKEIYL
151	SGIDFYQNGS	SYAFDTKQKN	LLKLAPNFKN	DNSHYIGHSK	NTDIKALEFL
201	EKTYKIKLYC	LCPNSLLANF	IELAPNLNSN	FIIQEKNNYT	KDILIPSSEA
251	YGKFSKNINF	KKIKIKENIY	YKLIKDLLRL	PSDIKHYFKG	K

SEQ ID NO: 4: Nucleotide sequence of bifunctional sialyltransferase-encoding *cstII* (ORF7a) from *LOS* biosynthesis locus of *C. jejuni* serotype O:10

ATGAAAAAAG	TTATTATTGC	TGGAAATGGA	CCAAGTTTAA	AAGAAATTGA	50
TTATTCAAGG	CTACCAAATG	ATTTTGATGT	ATTTAGATGC	AATCAATTTT	100
ATTTTGAAGA	TAAATACTAT	CTTGGTAAAA	AATTCAAAGC	AGTATTTTAC	150
AATCCTGGTC	TTTTTTTTGA	ACAATACTAC	ACTTTAAAAC	ATTTAATCCA	200
AAATCAAGAA	TATGAGACCG	AACTAATTAT	GTGTTCTAAT	TACAACCAAG	250
CTCATCTAGA	AAATGAAAAT	TTTGTAAGAA	CTTTTTACGA	TTATTTTCCT	300
GATGCTCATT	TGGGATATGA	TTTTTTTAAA	CAACTTAAAG	AATTTAATGC	350
TTATTTTAAA	TTTCACGAAA	TTTATCTCAA	TCAAAGAATT	ACCTCAGGAG	400
TCTATATGTG	TGCAGTAGCT	ATAGCCCTAG	GATACAAAGA	AATTTATCTT	450
TCTGGAATTG	ATTTTTATCA	AAATGGGTCA	TCTTATGCTT	TTGATACCAA	500
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AGCAAAATTT	ATAGAAGTAG	CGCCAAATTT	AAATTCAAAT	TTTATCATAC	700
AAGAAAAAAA	TAACTACACT	AAAGATATAC	TCATACCTTC	TAGTGAGGCT	750

TATGGAAAAT	TTTCAAAAAA	TATTAATTTT	AAAAAAATAA	AAATTAAAGA	800
AAATATTTAT	TACAAGTTGA	TAAAAGATCT	ATTAAGATTA	CCTAGTGATA	850
TAAAGCATT	TTTCAAAGGA	AAATAA			876

SEQ ID NO: 5. Amino acid sequence of bifunctional sialyltransferase *cstII* encoded by ORF 7a of *LOS* biosynthesis locus from *C. jejuni* serotype O:10

	10	20	30	40	50
1	MKKVIIAGNG	PSLKEIDYSR	LPNDFDVFR	C	NQFYFEDKYY LGKKFKAVFY
51	NPGLFFEQYY	TLKHLIQNQE	YETELIMCSN	YNQAHLENEN	FVKTFYDYFP
101	DAHLGYDFFK	QLKEFNAYFK	FHEIYLNQRI	TSGVYMCVA	IALGYKEIYL
151	SGIDFYQNGS	SYAFDTKQEN	LLKLAPDFKN	DRSHYIGHSK	NTDIKALEFL
201	EKTYKIKLYC	LCPNSLLANF	IELAPNLNSN	FIIQEKNNYT	KDILIPSSEA
251	YGKFSKNINF	KKIKIKENIY	YKLIKDLLRL	PSDIKHYFKG	K

SEQ ID NO: 6. Nucleotide sequence of *C. jejuni* serotype O:41 *cstII* coding region

ATGAAAAAAG	TTATTATTGC	TGGAAATGGA	CCAAGTTTAA	AAGAAATTGA	50
TTATTCAAGA	CTACCAAATG	ATTTTGATGT	ATTTAGATGC	AATCAATTTT	100
ATTTTGAAGA	TAAATACTAT	CTTGGTAAAA	AATGCAAAGC	AGTATTTTAC	150
AATCCTAGTC	TTTTTTTGA	ACAATACTAC	ACTTTAAAC	ATTTAATCCA	200
AAATCAAGAA	TATGAGACCG	AACTAATCAT	GTGTTCTAAT	TTTAACCAAG	250
CTCATCTAGA	AAATCAAAAT	TTTGTAACAAA	CTTTTTTACGA	TTATTTTCCT	300
GATGCTCATT	TGGGATATGA	TTTTTTTCAA	CAACTTAAAG	AATTCAATGC	350
TTATTTTAAA	TTTCACGAAA	TTTATTTCAA	TCAAAGAATT	ACCTCAGGGG	400
TCTATATGTG	CACAGTAGCC	ATAGCCCTAG	GATACAAAGA	AATTTATCTT	450
TCGGGAATTG	ATTTTATCA	AAATGGATCA	TCTTATGCTT	TTGATACCAA	500
ACAAAAAAT	CTTTTAAAT	TGGCTCCTAA	TTTTTAAAT	GATAATTCAC	550
ACTATATCGG	ACATAGTAAA	AATACAGATA	TAAAAGCTTT	AGAATTTCTA	600
GAAAAAACTT	ACGAAATAAA	GCTATATTGT	TTATGTCCTA	ACAGTCTTTT	650
AGCAAATTTT	ATAGAACTAG	CGCCAAATTT	AAATTCAAAT	TTTATCATAC	700
AAGAAAAAAA	TAACTATACT	AAAGATATAC	TCATACCTTC	TAGTGAGGCT	750
TATGGAAAAT	TTACAAAAAA	TATTAATTTT	AAAAAAATAA	AAATTAAAGA	800
AAATATTTAT	TACAAGTTGA	TAAAAGATCT	ATTAAGATTA	CCTAGTGATA	850
TAAAGCATT	TTTCAAAGGA	AAATAA			876

SEQ ID NO: 7. Amino acid sequence of *CstII* from *C. jejuni* serotype O:41

	10	20	30	40	50
1	MKKVIIAGNG	PSLKEIDYSR	LPNDFDVFR	C	NQFYFEDKYY LGKKCKAVFY
51	NPSLFFEQYY	TLKHLIQNQE	YETELIMCSN	FNQAHLENQN	FVKTFYDYFP
101	DAHLGYDFFK	QLKEFNAYFK	FHEIYFNQRI	TSGVYMCTVA	IALGYKEIYL
151	SGIDFYQNGS	SYAFDTKQKN	LLKLAPNFKN	DNSHYIGHSK	NTDIKALEFL
201	EKTYEIKLYC	LCPNSLLANF	IELAPNLNSN	FIIQEKNNYT	KDILIPSSEA
251	YGKFTKNINF	KKIKIKENIY	YKLIKDLLRL	PSDIKHYFKG	K

SEQ ID NO: 8. Nucleotide sequence of coding region for *CstII* from *C. jejuni* O:19.

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1  atgaaaaaag ttattattgc tggaaatgga ccaagtttaa aagaaattga
51  ttattcaagg ctaccaaatg attttgatgt atttagatgt aatcaatttt
101 attttgaaga taaatactat cttggtaaaa aatgcaaagc agtgttttac
151 acccctaatt tcttctttga gcaatactac actttaaaac atttaatcca
201 aaatcaagaa tatgagaccg aactaattat gtgttcta atacaaccaag
251 ctcattctaga aaatgaaaat tttgtaaaaa ctttttaaga ttattttcct
301 gatgctcatt tgggatatga ttttttttaa caacttaaag aatttaaatgc
351 ttatttttaa tttcacgaaa tttatttcaa tcaaagaatt acctcagggg
401 tctatatgtg tgcagtagcc atagccctag gatacaaaga aatttatctt
451 tcgggaattg atttttatca aaatgggtca tcttatgctt ttgataccaa
501 acaagaaaat ctttttaaac tagcccctga ttttaaaaat gatcgctcgc
551 actatatcgg acatagtaaa aatacagata taaaagcttt agaatttcta
601 gaaaaaactt acaaaaataa actatattgc ttatgtccta atagtctttt
651 agcaaatttt atagaactag cgccaaattt aaattcaaat tttatcatac
701 aagaaaaaaa taactacact aaagatatat tcataccttc tagtgaggct
751 tatggaaaat tttcaaaaaa tattaatttt aaaaaataa aaattaaaga
801 aaatgtttat tacaagttga taaaagatct attaagatta cctagtgata
851 taaagcatta tttcaaagga aaataa

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SEQ ID NO: 9: Amino acid sequence of *CstII* from *C. jejuni* O:19.

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1  MKKVIIAGNG PSLKEIDYSR LPNDFDVFR C NQFYFEDKYY LGKKCKAVFY
51  TPNFFFEQYY TLKHLIQNQE YETELIMCSN YNQAHLNEN FVKTFYDYFP
101 DAHLGYDFFK QLKEFNAYFK FHEIYFNQRI TSGVYMCABA IALGYKEIYL
151 SGIDFYQNGS SYAFDTKQEN LLKLAPDFKN DRSHYIGHSK NTDIKALEFL
201 EKTYKIKLYC LCPNSLLANF IELAPNLNSN FIIQEKNNYT KDILIPSSEA
251 YGKFSKNINF KIKIKENYVY YKLIKDLLRL PSDIKHYFKG K

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SEQ ID NO: 10. Amino acid sequence of *CstII* from *C. jejuni* strain NCTC 11168

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          10          20          30          40          50
1  MSMNINALVC GNGPSLKNID YKRLPKQFDV FRCNQFYFED RYFVGKDVKY
51  VFFNPFFVFFE QYYTSKKLIQ NEEYNIENIV CSTINLEYID GFQFVDNFEL
101 YFSDAFLGHE IIKKLKDFFA YIKYNEIYNR QRITSGVYMC ATAVALGYKS
151 IYISGIDFYQ DTNNLYAFDN NKKNLLNKCT GFKNQKFKFI NHSMACDLQA
201 LDYLMKRYDV NIYSLNSDEY FKLAPDIGSD FVLSKKPKKY INDILIPDKY
251 AQERYYGKKS RLKENLHYKL IKDLIRLPSD IKHYLKEKYA NKNR

```

SEQ. ID NO: 11. Nucleotide sequence for coding region for *Cst III* from *C. jejuni* O:4

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1  ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA TTATTCAAGG
61  CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT ATTTTGAAGA TAAATACTAT
121 CTTGGTAAAA AATGCAAAGC AGTGTTTTAC ACCCCTGGTT TCTTCTTTGA GCAATACTAC
181 ACTTTAAAAC ATTTAATCCA AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT
241 TACAACCAAG CTCATCTAGA AAAATGAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT
301 GATGCTCATT TGGGATATGA TTTTTTAA CAACTTAAAG AATTTAATGC TTATTTTAAA
361 TTTACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG TCTATATGTG TGCAGTAGCC
421 ATAGCCCTAG GATACAAAGA AATTATCTT TCGGGAATTG ATTTTATCA AAATGGGTCA
481 TCTTATGCTT TTGATACCAA ACAAGAAAAT CTTTAAAAAC TAGCCCTGA TTTTAAAAAT
541 GATCGCTCAC ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTCTA

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601 GAAAAAACTT ACAAATAAA ACTATATTGC TTATGTCCTA ACAGTCTTTT AGCAAATTTT
 661 ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC AAGAAAAAAA TAACTACACT
 721 AAAGATATAC TCATACCTTC TAGTGAGGCT TATGGAAAAT TTTCAAAAAA TATTAATTTT
 781 AAAAAAATAA AAATTAAAGA AAATGTTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA
 841 CCTAGTGATA TAAAGCATT TTTCAAAGGA AAA

SEQ ID NO: 12. Amino acid sequence of Cst II from *C. jejuni* 0:4

MKKVIIAGNG PSLKEIDYSR LPNDFDVFR C NQFYFEDKYY LGKKCKAVFY TPGFFFEQY
 YTLKHLIQNQ EYETELIMCS NYNQAHLNE NFVKTFYDYF PDAHLGYDFF KQLKEFNAY
 FKFHEIYFNQ RITSGVYMCA VAIALGYKEI YLSGIDFYQN GSSYAFDTKQ ENLLKLAPD
 FKNDRSHYIG HSKNTDIKAL EFLEKTYKIK LYCLCPNSLL ANFIELAPNL NSNFIIQEK
 NNYTKDILIP SSEAYGKFSK NINFKKIKIK ENVVYKLIKD LLRLPSDIKH YFKGK

SEQ ID NO: 13. Nucleotide sequence for coding region for Cst II from *C. jejuni* 0:36

ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA TTATTC AAGG
 CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT ATTTTGAAGA TAAATACTAT
 CTTGGTAAAA AATGCAAAAC AGTGTTTTAC ACCCCTAATT TCTTCTTTGA GCAATACTAC
 ACTTTAAAC ATTTAATCCA AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT
 TACAACCAAG CTCATCTAGA AAATGAAAAA TTTGTAAAAA CTTTTTACGA TTATTTTCCT
 GATGCTCATT TGGGATATGA TTTTTTTAAA CAACTTAAAG AATTTAATGC TTATTTTAAA
 TTTCACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG TCTATATGTG TGCAGTAGCC
 ATAGCCCTAG GATACAAAGA AATTTATCTT TCGGGAATTG ATTTTTATCA AAATGGGTCA
 TCTTATGCTT TTGATACCAA ACAAGAAAAT CTTTTAAAC TAGCCCCTGA TTTTAAAAAT
 GATCGCTCAC ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTCTA
 GAAAAAACTT ACAAATAAA ACTATATTGC TTATGTCCTA ATAGTCTTTT AGCAAATTTT
 ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC AAGAAAAAAA TAACTACACT
 AAAGATATAC TCATACCTTC TAGTGAGGCT TATGGAAAAT TTTCAAAAAA TATTAATTTT
 AAAAAAATAA AAATTAAAGA AAATGTTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA
 CCTAGTGATA TAAAGCATT TTTCAAAGGA AAA

SEQ ID NO: 14. Amino acid sequence of Cst II from *C. jejuni* 0:36.

MKKVIIAGNG PSLKEIDYSR LPNDFDVFR C NQFYFEDKYY LGKKCKTVFY TPNFFFEQY
 YTLKHLIQNQ EYETELIMCS NYNQAHLNE NFVKTFYDYF PDAHLGYDFF KQLKEFNAY
 FKFHEIYFNQ RITSGVYMCA VAIALGYKEI YLSGIDFYQN GSSYAFDTKQ ENLLKLAPD
 FKNDRSHYIG HSKNTDIKAL EFLEKTYKIK LYCLCPNSLL ANFIELAPNL NSNFIIQEK
 NNYTKDILIP SSEAYGKFSK NINFKKIKIK ENVVYKLIKD LLRLPSDIKH YFKGK

SEQ ID NO: 15. Nucleotide sequence of glycosyltransferase-encoding ORF 4a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

ATGAAGAAAA	TAGGTGTAGT	TATACCAATC	TATAATGTAG	AAAAATATTT	50
AAGAGAATGT	TTAGATAGCG	TTATCAATCA	AACTTATACT	AACTTAGAAA	100
TCATACTTGT	CAATGATGGT	AGCACAGATG	AACACTCACT	CAATATTGCA	150
AAAGAAATATA	CCTTAAAAGA	TAAAAGAATA	ACTCTTTTTG	ATAAGAAAAA	200
TGGGGGTTTA	AGTTCAGCTA	GAAATATAGG	TATAGAATAC	TTTAGCGGGG	250
AATATAAATT	AAAAAACAAA	ACTCAACATA	TAAAAGAAAA	TTCTTTAATA	300
GAATTTCAAT	TGGATGGTAA	TAATCCTTAT	AATATATATA	AAGCATATAA	350
AAGCTCTCAA	GCTTTTAATA	ATGAAAAAGA	TTTAACCAAT	TTTACTTACC	400
CTAGTATAGA	TTATATTATA	TTCTTAGATA	GTGATAATTA	TTGGAAACTA	450
AACTGCATAG	AAGAATGCGT	TATAAGAATG	AAAAATGTGG	ATGTATTGTG	500
GTTTGACCAT	GATTGCACCT	ATGAAGACAA	TATAAAAAAT	AAGCACAAAA	550
AAACAAGGAT	GGAAATTTTT	GATTTTAAAA	AAGAATGTAT	AATCACTCCA	600

AAAGAATATG	CAAATCGAGC	ATTAAGTGTA	GGATCTAGAG	ATATTTCTTT	650
TGGATGGAAT	GGAATGATTG	ATTTTAATTT	TTTAAAGCAA	ATTAAACTTA	700
AATTTATAAA	TTTTATTATC	AATGAAGATA	TACACTTTGG	GATAATTTTG	750
TTTGCTAGTG	CTAATAAAAT	TTATGTTTTA	TCACAAAAGT	TGTATTTGTG	800
TCGTTTAAGA	GCAAACAGTA	TATCAAATCA	TGATAAGAAG	ATTACAAAAG	850
CAAATGTGTC	AGAGTATTTT	AAAGATATAT	ATGAAACTTT	CGGGGAAAAC	900
GCTAAGGAAG	CAAAAAATTA	TTTAAAAGCA	GCAAGCAGGG	TTATAACTGC	950
TTTAAAATTG	ATAGAATTTT	TTAAAGATCA	AAAAAACGAA	AATGCACTTG	1000
CTATAAAAGA	AACATTTTTA	CCTTGCTATG	CCAAAAAAGC	TTTAATGATT	1050
AAAAAATTTA	AAAAAGATCC	TTTAAATTTA	AAGGAACAAT	TAGTTTTAAT	1100
TAAACCTTTT	ATTCAAACAA	AACTTCCTTA	TGATATTTGG	AAATTTTGGC	1150
AAAAAATAAA	AAATATTTAA				1170

SEQ ID NO: 16: Nucleotide sequence of β 1,4 GalNAc transferase-encoding ORF 5a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

ATGCTATTTT	AATCATACTT	TGTGAAAATA	ATTTGCTTAT	TCATCCCTTT	50
TAGAAAAATT	AGACATAAAA	TAAAAAAAAC	ATTTTTACTA	AAAAACATAC	100
AACGAGATAA	AATCGATTCT	TATTTACCAA	AAAAAACTCT	TGTGCAAATT	150
AATAAATACA	ACAATGAAGA	TTTAATTAAA	CTTAATAAAG	CTATTATAGG	200
GGAGGGGCAT	AAAGGATATT	TTAATTATGA	TGAAAAATCT	AAAGATCCAA	250
AATCTCCTTT	GAATCCTTGG	GCTTTTATAC	GAGTAAAAAA	TGAAGCTATT	300
ACCTTAAAAG	CTTCTCTTGA	AAGCATATTG	CCTGCTATCC	AAAGAGGTGT	350
TATAGGATAT	AATGATTGTA	CCGATGGAAG	TGAAGAAATA	ATTCTAGAAT	400
TTTGCAAACA	ATATCCTTCA	TTTATACCAA	TAAAATATCC	TTATGAAATT	450
CAAATTCAAA	ACCCAAAATC	AGAAGAAAAT	AAACTCTATA	GCTATTATAA	500
TTATGTTGCA	AGTTTTATAC	CAAAAGATGA	GTGGCTTATA	AAAATAGATG	550
TGGATCATAT	CTATGATGCT	AAAAAACTTT	ATAAAAGCTT	CTATATACCA	600
AAAAACAAAT	ATGATGTAGT	TAGTTATTCA	AGGGTTGATA	TTCACTATTT	650
TAATGATAAT	TTTTTTCTTT	GTAAAGATAA	TAATGGCAAT	ATATTGAAAG	700
AACCAGGAGA	TTGCTTGCTT	ATCAATAATT	ATACTTAAA	ATGGAAAGAA	750
GTATTAATTG	ACAGAATCAA	TAACAATTGG	AAAAAAGCAA	CAAAACAAAG	800
TTTTTCTTCA	AATATACACT	CTTTAGAGCA	ATTAAAGTAT	AAACACAGGA	850
TATTATTTCA	CACTGAATTA	AATAATTATC	ATTTTCCTTT	TTTAAAAAAA	900
CATAGAGCTC	AAGATATTTA	TAAATATAAT	TGGATAAGTA	TTGAAGAATT	950
TAAAAAATTC	TATTTACAAA	ATATTAATCA	TAAAATAGAA	CCTTCTATGA	1000
TTTCAAAAGA	AACTCTAAAA	AAAATATTCT	TAACATTGTT	TTAA	1044

SEQ ID NO: 17: Amino acid sequence of β 1,4 GalNAc transferase from *C. jejuni* strain OH4384 (encoded by ORF 5a of *LOS* biosynthesis locus)

	10	20	30	40	50
1	MLFQSYFVKI	ICLFIPFRKI	RHKIKKTFL	KNIQRDKIDS	YLPKKTTLVQI
51	NKYNNEGLIK	LNKAIIGEGH	KGYFNYDEKS	KDPKSPLNPW	AFIRVKNEAI
101	TLKASLESIL	PAIQRGVIGY	NDCTDGSEEI	ILEFCKQYPS	FIPIKYPYEI
151	QIQNPKESEN	KLYSYNYVA	SFIPKDEWLI	KIDVDHIYDA	KKLYKSFYIP
201	KNKYDVVSYS	RVDIHYFNDN	FFLCKDNNGN	ILKEPGDCLL	INNYNLKWKE
251	VLIDRINNNW	KKATKQSFSS	NIHSLEQLKY	KHRILFHTEL	NNYHFPFLKK
301	HRAQDIYKYN	WISIEEFKKF	YLQNINHKE	PSMISKETLK	KIFLTLF

SEQ. ID NO: 18. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.

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ATGACTTTGT TTTATAAAAT TATAGCTTTT TTAAGATTGC TTAAAATTGA TAAAAAATTA
AAATTTGATA ATGAATATTT TTTAAACTTA AATAAAAAAA TCTACAATGA AAAGCATAAA
GGTTTTTTTG ATTTTGATCC AAACCTCAAA GATACAAAAT CTCCTTTTAA TCCATGGGCT
TTTATAAGAG TAAAAAATGA AGCCACTACT TTAAGAGTAT CACTTGAAAG TATGTTACCT
GCCATACAAA GAGGTGTTAT AGGATATAAT GATTGTACTG ATGGAAGTGA AGAAATTATT
TTGGAATTTT GCAAACAATA CCCTTCGTTT ATACCAGTAA AATATCCCCA TGAGGTGCAA
ATTGAAAATC CGCAAAGCGA AGAAAATAAA CTTCATAGTT ATTATAACTA TGTAGCTAGT
TTTATACCGC AAGATGAGTG GCTTATAAAA ATAGATGTGG ATCATTACTA TGATGCAAAA
AAATTATATA AGAGTTTTTA TATGGCATCA AAAAATACTG CTGTTAGATT TCCAAGAATT
AATTTTTTAA TACTAGATAA AATTGTAATT CAAAATATAG GAGAATGTGG TTTTATCGAT
GGAGGGGATC AATTGTTAAT TCAAAGTGC AATAGTGTAT TTATAGAAAG AATGGTTTCA
AAGCAAAGTC AGTGGATTGA TCCTGAAAAA ACTGTGAAAG AATGTATTTC TGAACAGCAA
ATTATACCCA AACATATAAA AATCTTACAA GCAGAATTAC TTCAATGGCA TTTTCCTGCT
TTAAAATATC ATAGAAATGA TTATCAAAAA CATTGGGATG CTTTAACTTT AGAAGATTTT
AAAAAATCC ATTATAGACA TAGAAAAATA AAGAAAATAA ATTATACAAT GCTTGATGAA
AAAGTAATTC GTGAAATATT AGATAAATTT AAATTGAGTG GTAAAAAAT GACTTTAGCT
ATAATACCTG CTCGAGCTGG TTCAAAGGT ATAAAAAATA AAAATTTAGC TCTTTTGCAT
GATAGGCCTT TGTGTATTA TACTATCAAT GCAGCAAAAA ATTCAAAGTA TGTATAGAAA
ATTGTTTTAA GTAGTGATGG CGATGATATA TTAGAATATG GACAAACTCA AGGTGTAGAT
GTGTTAAAAA GACCTAAAGA ATTAGCGCTA GATGATACAA CTAGTGATAA GGTGTGATTG
CATACCTTGA GTTTTTATAA AGATTATGAA AATATTGTTT TATTACAACC CACTTCTCCT
TTAAGGACAA ATGTACATAT AGATGAAGCT TTTTTAAAAA TTA AAAATGA AAAC TCAAAT
GCATTAATAA GTGTTGTAGA ATGTGATAAT AAAATTTTAA AAGCTTTTAT AGATGATAAT
GGTAACCTAA AAGGAATTTG TGATAACAAA TATCCATTTA TGCCTAGACA AAAATTACCA
AAAACCTATA TGAGTAATGG TGCAATTTAT ATAGTAAAGT CAAATTTATT TTTAAATAAC
CCAACCTTTC TACAAGAAAA AACAAGTTGC TATATAATGG ACGAAAAAGC TAGTTTGGAT
ATAGATACAA CAGAGGATTT AAAAAGAGTT AATAATATAA GCTTCTTA
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SEQ. ID NO: 19. Amino Acid sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.

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MTLFYKIIAF LRLKIDKKL KFDNEYFLNL NKKIYNEKHK GFFDFDPNSK DTKSPLNPW
AFIRVKNEAT TLRVSLESLM PAIQRGVIGY NDCTDGSEEI ILEFCKQYPS FIPVKYPHE
VQIENPQSEE NKLHSYNYV ASFIPQDEWL IKIDVDHYD AKKLYKSFYM ASKNTAVRF
PRINFLILDK IVIQNIGECG FIDGGDQLLI QKCNVFIER MVSQSQWID PEKTVKELY
SEQQIIPKHI KILQAEELLQW HFPALKYHRN DYQKHLDALT LEDFKKIHyr HRTIKKINY
TMLDEKVIRE ILDKFKLSGK KMTLAIIPAR AGSGIKNKN LALLHDRPLL YYTINAANKN
SKYVDKIVLS SDGDDILEYG QTQGVVDVLR PKELALDDTT SDKVVLHTLS FYKDYENIV
LLQPTSPLRT NVHIDEAFLK FKNENSNALI SVVECDNKIL KAFIDDNGLN KGICDNKYP
FMPRQKLPKT YMSNGAIYIV KSNLFLNNPT FLQEKTSYI MDEKASLDID TTEDLKRNNNI SFL
```

SEQ. ID NO: 20. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:10.

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ATGCTATTTT AATCATACTT TGTGAAATA ATTTGCTTAT TCATCCCTTT TAGAAAAATT
AGACATAAAA TAAAAAAAC ATTTTTACTA AAAACATAC AACGAGATAA AATCGATTCT
TATCTACCAA AAAAAACTCT TATACAAATT AATAAATACA ACAATGAAGA TTTAATTAAA
CTTAATAAAG CTATTATAGG GGGGGGGCAT AAAGGATATT TTAATTATGA TGA AAAATCT
AAAGATCCAA AATCTCCTTT GAATCCTTGG GCTTTTATAC GAGTAAAAAA TGAAGCTATT
ACCTTAAAG CTTCCTCTGA AAGCATATTG CCTGCTATT CAAAGAGGTGT TATAGGATAT
AATGATTGCA CCGATGGAAG TGAAGAAATA ATTCTAGAAT TTTGCAAACA ATATCCTTCA
TTTATACCAA TAAAATATCC TTATGAAATT CAAATTCAAA ACCCAAATC AGAAGAAAAT
AAACTCTATA GCTATTATAA TTATGTTGCA AGTTTTATAC CAAAAGATGA GTGGCTCATA
AAAATAGATG TGGATCATT TATGATGCA AAAAATTAT ATAAGAGTTT TTATATACCT
AGAAAAAAT ATCATGTAAT TAGTTACTCT AGGATAGATT TTATATTTAA TGAAGAAAAA
TTTTATGTTT ATCGGAATAA GGAGGGGGAG ATTTTAAAG CTCCTGGAGA TTGTTTAGCA
ATACAAAACA CTAACCTTAT TTGGAAAGAA ATACTTATG AAGATGATAC ATTTAAGTGG
AATACTGCAA AAAATAATAT AGAGAATGCA AAATCATATG AAATTTTAAA AGTTAGAAAT
AGAATTTATT TTACTACAGA ACTTAATAAT TATCATTTTC CATTTATAAA AAATTATAGA
AAAAATGATT ATAAGCAGTT AAATTGGGTT AGCTTAGATG ATTTTATTAA AAATTATAAA
GAAAAATTAA AAAATCAAAT AGATTTTAAA ATGCTAGAAT ACAAACATT AAAAAAAGTG
TACAAAAAGC TTACATCTTC AGCAAGCGAT AAAATT
```

SEQ. ID NO: 21. Amino acid sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.

MLFQSYFVKI	ICLFIPFRKI	RHKIKKTFL	KNIQRDKIDS	YLPKKTLIQI	NKYNNEDELI
KLNKAIIGGG	HKGYFNYDEK	SKDPKSPLNP	WAFIRVKNEA	ITLKASLESI	LPAIQRGVI
GYNDCTDGE	EIILEFCKQY	PSFIPIKYPY	BIQIQNPKE	ENKLYSYNY	VASFIPKDE
WLIKIDVDHY	YDAKKLYKSF	YIPRKNYHVI	SYSRIDFIFN	EEKFYVVRNK	EGEILKAPG
DCLAIQNTNL	FWKEILIEDD	TFKWNTAKNN	LENAKSYEIL	KVRNRIYFTT	ELNNYHFPF
IKNYRKNDYK	QLNWVSLDDF	IKNYKEKLKN	QIDFKMLEYK	TLKKVYKKLT	SSASDKI

SEQ. ID NO: 22. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1. O:36

DNA :

ATGCTTAAAA	AAATCATTTC	TTTATATAAA	AGATACTCGA	TTTCTAAAAA	ATTGGTTTTA
GATAATGAGC	ATTTTCATTAA	GGAAAAATAAA	AACATCTATG	GAAAAAAACA	TAAGGGCTTT
TTTGACTTTG	ATGAAAAGGC	TAAGGATGTG	AAATCACCCC	TTAATCCTTG	GGGATTTATC
AGGGTTAAAA	ATGAAGCTTT	AACCCTAAGA	GTTTCTTTAG	AAAGTATACT	ACCTGCTTTA
CAAAGAGGAA	TTATAGCTTA	CAACGACTGT	GATGATGGGA	GTGAAGAGCT	TATTTTAGAA
TTTTGCAAGC	AATATCCCAA	CTTCATTGCT	AAAAAATATC	CTTATAAAGT	AGATCTAGAA
AATCCTAAAA	ATGAAGAAAA	TAAACTTTAC	TCTTATTACA	ATTGGGCAGC	ATCTTTTATA
CCCTTAGATG	AGTGGTTTAT	AAAAATCGAT	GTGGATCATT	ACTACGATGC	CAAGAAGCTT
TATAAGAGTT	TTTATAGGAT	TGATCAAGAA	AATAAAGCCT	TATGCTACCC	AAGAATTAAT
TTTATAATCT	TAAATGGAAA	TATTTATGTG	CAAAATAGTG	GAAATTATGG	ATTCATAGGG
GGGGGGGATC	AACCTCTGAT	TAAAAGAAGA	AATAGTAGCT	TTATAGAAAAG	AAGGGTTTCA
AAAAAAGCCA	ATGGATAGAT	CCTAAGGGAC	TTATAGAAGA	ACTCTACTCC	GAGCAACAAG
TCTTATCTCA	AGGAGTGAAA	ATACTACAAG	CTCCCCTACT	TCAGTGGCAT	TTTCTGCCT
TAAATACCG	CCGAAACGAT	TACCAACAAT	ATTTAGATAT	CTTGAGTTTA	GAAGAATTC
AGGCCTTTCA	TCGTAAGAGC	AAAGAGGCTA	AAAAAATAGA	CTTTGCCATG	CTAAAACGCC
CTGTAATCGA	GCAATATTA	AAGAAATTTT	AAGGAGAGAT	AAAA	

SEQ. ID NO: 23. Amino acid sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:36.

MLKKIISLYK	RYSISKKLVL	DNEHFIKENK	NIYGKKHKGF	FDFDEKAKDV
KSPLNPWGFI	RVKNEALTLR	VSLESILPAL	QRGIIAYNDC	DDGSEELILE
FCKQYPNFIA	KKYPYKVDLE	NPKNEENKLY	SYYNWAASFI	PLDEWFIKID
VDHYDAKKL	YKSFYRIDQE	NKALCYPRIN	FIILNGNIYV	QNSGNYGFIG
GGDQLLIKRR	NSSFIERRVS	KKSQWIDPKG	LIEELYSEQQ	VLSQGVKILQ
APLLQWHFPA	LKYRRNDYQQ	YLDILSLEEF	QAFHRKSKEA	KKIDFAMLR
PVIEQILKKF	QGEIK			

SEQ. ID NO: 24. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* NCTC11168

ATGACTTTGT	TTTATAAAAT	TATAGCTTTT	TTAAGATTGC	TTAAAATTGA	TAAAAAATTA
AAATTTGATA	ATGAATATTT	TTTAAACTTA	AATAAAAAAA	TCTACGATGA	AAAGCATAAA
GGTTTTTTTG	ATTTTGATCC	AAACTCAAAA	GATACAAAAT	CTCCTTTAAA	TCCATGGGCT
TTTATAAGAG	TAAAAAATGA	AGCCACTACT	TTAAGAGTAT	CACTTGAAAAG	TATGTTACCT
GCCATACAAA	GAGGTGTTAT	AGGATATAAT	GATTGTACTG	ATGGAAGTGA	AGAAATTATT
TTGGAATTTT	GCAAAACAATA	CCCTTCGTTT	ATACCAGTAA	AATATCCCA	TGAGGTGCAA
ATTGAAAATC	CGCAAAGCGA	AGAAAATAAA	CTTCATAGTT	ATTATAACTA	TGTAGCTAGT
TTTATACCGC	AAGATGAGTG	GCTTATAAAA	ATAGATGTGG	ATCATTACTA	TGATGCAAAA
AAATTATATA	AGAGTTTTTA	TATGGCATCA	AAAAAATACTG	CTGTTAGATT	TCCAAGAATT
AATTTTTTAA	TACTAGATAA	AATTGTAATT	CAAAATATAG	GAGAATGTGG	TTTTATCGAT
GGAGGGGATC	AATTGTTAAT	TCAAAAGTGC	AATAGTGTAT	TTATAGAAAAG	AATGGTTTCA

AAGCAAAGTC	AGTGGATTGA	TCCTGAAAAA	ACTGTGAAAG	AATTGTATTC	TGAACAGCAA
ATTATACCCA	AACATATAAA	AATCTTACAA	GCAGAATTAC	TTCAATGGCA	TTTTCCTGCT
TTAAAATATC	ATAGAAATGA	TTATCAAAAA	CATTTGGATG	CTTTAACTTT	AGAAGATTTT
AAAAAATCC	ATTATAGACA	TAGAAAAATA	AAGAAAATAA	ATTATACAAT	GCTTGATGAA
AAAGTAATTC	GTGAAATATT	AGATAAATTT	AAATTGAGTG	GTAAAAAAAT	GACTTTAGCT
ATAATACCTG	CTCGAGCTGG	TTCAAAAGGT	ATAAAAAATA	AAAATTTAGC	TCTTTTGCAT
GATAGGCCTT	TGTTGTATTA	TACTATCAAT	GCAGCAAAAA	ATTCAAAAGTA	TGTAGATAAA
ATTGTTTTAA	GTAGTGATGG	CGATGATATA	TTAGAATATG	GACAAACTCA	AGGTGTAGAT
GTGTTAAAAA	GACCTAAAGA	ATTAGCGCTA	GATGATACAA	CTAGTGATAA	GTTTGTATTG
CATACCTTGA	GTTTTTATAA	AGATTATGAA	AATATTGTTT	TATTACAACC	CACCTCTCCT
TTAAGGACAA	ATGTACATAT	AGATGAAGCT	TTTTTAAAAT	TTAAAAATGA	AAACTCAAAT
GCATTAATAA	GTGTTGTAGA	ATGTGATAAT	AAAATTTTAA	AAGCTTTTAT	AGATGATAAT
GGTAACTTAA	AAGGAATTTG	TGATAACAAA	TATCCATTTA	TGCCTAGACA	AAAATTACCA
AAAACCTTATA	TGAGTAATGG	TGCAATTTAT	ATAGTAAAGT	CAAATTTATT	TTTAAATAAC
CCAACCTTTTC	TACAAGAAAA	AACAAGTTGC	TATATAATGG	ACGAAAAAGC	TAGTTTGGAT
ATAGATACAA	CAGAGGATTT	AAAAAGAGTT	AATAATATAA	GCTTCTTA	

SEQ. ID NO: 25. Amino Acid sequence of β -1,4-GalNAc transferase from *C. jejuni* NCTC11168

MTLFYKIIAF	LRLKIDKKL	KFDNEYFLNL	NKKIYDEKHK	GFFDFDPNSK	DTKSPLNPW
AFIRVKNEAT	TLRVSLESML	PAIQRGVIGY	NDCTDGSEEI	ILEFCKQYPS	FIPVKYPHE
VQIENPQSEE	NKLHSYYNYV	ASFIPQDEWL	IKIDVDHYD	AKKLYKSFYM	ASKNTAVRF
PRINFLILDK	IVIQNIGECG	FIDGGDQLLI	QKCNVFIER	MVSKQSQWID	PEKTVKELY
SEQQIIPKHI	KILQAELLQW	HFPALKYHRN	DYQKHLDAIT	LEDFFKKIHYR	HRKIKKINY
TMLDEKVIRE	ILDKFKLSGK	KMTLAIIPAR	AGSKGIKNKN	LALLHDRPLL	YTTINAANK
SKYVDKIVLS	SDGDDILEYG	QTQGVVDLKR	PKELALDDTT	SDKVVLHTLS	FYKDYENIV
LLQPTSPLRT	NVHIDEAFLK	FKNENSNALI	SVVECDNKIL	KAFIDDNGNL	KGICDNKYP
FMPRQKLPKT	YMSNGAIYIV	KSNLFLNNPT	FLQEKTSYI	MDEKASLDID	TTEDLKRVNN ISFL

SEQ ID NO: 26: Nucleotide sequence of β 1,3-galactosyltransferase-encoding ORF 6a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

ATGTTTAAAA	TTTCAATCAT	CTTACCAACT	TATAATGTGG	AACAATATAT	50
AGCAAGGGCA	ATAGAAAGCT	GTATCAATCA	GACTTTTAAA	GATATAGAAA	100
TAATTGTAGT	TGATGATTGT	GGAAATGATA	ATAGTATAAA	TATAGCCAAA	150
GAATACTCTA	AAAAAGACAA	AAGAATAAAA	ATAATCCACA	ATGAAAAAAA	200
CTTAGGTCTT	TTAAGAGCAA	GATATGAAGG	TGTGAAAGTA	GCAAACTCTC	250
CTTATATAAT	GTTTTTAGAT	CCTGATGATT	ATTTGGAAGT	AAATGCTTGT	300
GAAGAGTGTA	TAAAAATTTT	AGATGAACAG	GATGAAGTTG	ATTTAGTGTT	350
TTTCAATGCT	ATTGTTGAAA	GTAATGTTAT	TTCATATAAA	AAGTTTGACT	400
TTAATTCTGG	TTTTTATAGC	AAAAAAGAGT	TTGTAAAAAA	AATTATTGCA	450
AAGAAAAATT	TATATTGGAC	TATGTGGGGG	AAACTTATAA	GAAAGAAATT	500
GTATTTAGAA	GCTTTTGCGA	GTTTAAGACT	CGAGAAAGAT	GTTAAATCA	550
ATATGGCTGA	AGATGTATTG	TTATATTATC	CAATGTTAAG	TCAAGCTCAA	600
AAAATAGCAT	ATATGAACTG	TAATTTATAT	CATTACGTGC	CTAATAATAA	650
TTCAATTTGT	AATACTAAGA	ATGAAGTGCT	TGTTAAAAAT	AATATTCAAG	700
AGTTGCAGTT	GGTTTTAAAC	TATTTAAGGC	AAAATTATAT	TTTAAACAAG	750
TATTGTAGCG	TTCTCTATGT	GCTAATTAAA	TATTTGCTAT	ATATTCAAAT	800
ATATAAAATA	AAAAGAACAA	AATTAATGGT	TACATTATTA	GCTAAAAATA	850
ATATTTTAAC	TTTAAAAAAT	TTATTTAAAT	ATAAAAAATT	TTTAAACAA	900
TGTTAA					906

SEQ ID NO: 27 Amino acid sequence of β 1,3-galactosyltransferase encoded by ORF 6a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

	10	20	30	40	50
1	MFKISIIILPT	YNVEQYIARA	IESCINQTFK	DIEIIVVDDC	GNDNSINIAK
51	EYSKKDKRIK	IIHNEKNLGL	LRARYEGVKV	ANSPYIMFLD	PDDYLELNAC
101	EECIKILDEQ	DEVDLVFFNA	IVESNVISYK	KDFDNSGFYS	KKEFVKKIIA
151	KKNLYWTMWG	KLIRKKLYLE	AFASLRLEKD	VKINMAEDVL	LYYPMLSQAQ
201	KIAYMNCNLY	HYVPNNNSIC	NTKNEVLVKN	NIQELQLVLN	YLRQNYILNK
251	YCSVLYVLIK	YLLYIQIYKI	KRTKLMVTLL	AKINILTTLKI	LFKYKKFLKQ
301	C				

SEQ ID NO: 28. Nucleotide sequence of CgtB β 1,3 galactosyltransferase from *C. jejuni* serotype O:2 (strain NCTC 11168).

ATGAGTCAAA	TTTCCATCAT	ACTACCAACT	TATAATGTGG	AAAAATATAT	50
TGCTAGAGCA	TTAGAAAGTT	GCATTAACCA	AACTTTTAAA	GATATAGAAA	100
TCATTGTAGT	AGATGATTGT	GGTAATGATA	AAAGTATAGA	TATAGCTAAA	150
GAGTATGCTA	GTAAAGATGA	TAGAATAAAA	ATCATAACATA	ATGAAGAGAA	200
TTTAAAGCTT	TTAAGAGCAA	GATATGAAGG	TGCTAAAGTA	GCAACTTCAC	250
CTTATATCAT	GTTTTTAGAT	TCTGATGATT	ATTTAGAACT	TAATGCTTGC	300
GAAGAATGTA	TTAAAATTTT	GGATATGGGT	GGGGGGGGTA	AAATTGATTT	350
GTTGTGTTTT	GAAGCTTTTA	TTACCAATGC	AAAAAAATCA	ATAAAAAAAT	400
TAAATATAAA	ACAAGGAAAA	TACAACAACA	AAGAATTTAC	AATGCAAATA	450
CTTAAACTA	AAAATCCATT	TTGGACAATG	TGGGCTAAAA	TAATCAAAAA	500
AGATATTTAT	TTAAAAGCCT	TCAACATGTT	AAATCTCAAA	AAAGAAATCA	550
AAATAAATAT	GGCAGAAGAT	GCCTTATTAT	ATTATCCTTT	GACAATATTA	600
TCTAATGAAA	TATTTTACTT	AACACAACCT	TTGTATACCC	AGCATGTAAA	650
TAGCAATTCT	ATAACAAATA	ATATTAATTC	TTTAGAAGCT	AATATTCAAG	700
AACATAAAAT	TGTTTTAAAT	GTTTTAAAAT	CAATTAAAAA	TAAAAAAACA	750
CCTCTATATT	TTCTAATTAT	ATATTTATTA	AAAATTCAAT	TATTGAAATA	800
TGAACAAAAT	TTTAATAAAA	GAAATATAAA	TCTTATTTAT	TATAAAATAA	850
ATATTTTATA	TCAAAAATAT	CAATTCAAAT	GGAAAAAATT	TTTATATAAT	900
TTAATTCCGT	AA				912

SEQ ID NO: 29. Amino acid sequence of CgtB β 1,3 galactosyltransferase from *C. jejuni* serotype O:2 (strain NCTC 11168).

	10	20	30	40	50
1	MSQISIIILPT	YNVEKYIARA	LESCINQTFK	DIEIIVVDDC	GNDKSIDIAC
51	EYASKDDRIK	IIHNEENLKL	LRARYEGAKV	ATSPYIMFLD	SDDYLELNAC
101	EECIKILDMG	GGGKIDLLCF	EAFITNAKKS	IKKLNIKQ GK	YNNKEFTMQL
151	KTKNPFWTMW	AKIIKKDIYL	KAFNMLNLKK	EIKINMAEDA	LLYYPLTILS
201	NEIFYLTQPL	YTQHVNSNSI	TNNINSLEAN	IQEHKIVLVN	LKSIKNKKTP
251	LYFLIIYLLK	IQLLKYEQNF	NKRNINLIYY	KINILYQKYQ	FKWKKFLYNL
301	IP				

SEQ ID NO. 30: Nucleotide sequence of β -1,3-galactosyl transferase from *C. jejuni* O:10

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ATGTTTAAAA TTTCAATCAT CTTGCCAACT TATAATGTGG AACAAATATAT AGCAAGGGCA
ATAGAAAGTT GTATCAATCA GACTTTTAAA AATATAGAAA TAATTGTAGT TGATGATTGT
GGAAGTGACA AAAGTATAGA TATAGTTAAA GAATATGCCA AAAAAGATGA TAGAATAAAA
ATCATACATA ATGAAGAAAA TTTAAAACTT TTAAGAGCTA GATATGAAGG TGTAAGAGTA
GCAAACTCTC CTTATATAAT GTTTTGTAGT CCTGATGATT ATTTAGAACT TAATGCTTGT
GAAGAATGTA TGAAAATTTT AAAAAACAAT GAAATAGATT TATTATTTTT TAATGCATTT
GTATTGGAAT ATAACAATAA AATAGAAAGA AAGTTGAATT TTCAAGAAAA ATGTTATGTA
AAAAAAGATT TTTTAAAAGA ACTATTAAAA ACTAAAAATT TATTTTGGAC AGTGTGGGCA
AAAGTCATAA AAAAAGAATT ATATCTCAAG GCTGTTGGTT TAATATCGCT AGAAAATGCT
AAAATAAATA TGGCTGAAGA TGTTTATTAT TATTACCCTT TGATAAATAT TTCAAATACT
ATATTTCACT TGAGTAAAAA TTTATACAAT TATCAAATAA ATAATTTCTC TATAACCAAA
ACATTAACAT TGCAAAATAT AAAAACAAAT ATACAAGAAC AAGATAATGT TCTATATCTT
CTAAAGAAGA TGCAATATAA TTACAATTTT AACTTAACTT TGCTTAAATT AATTGAGTAT
TTTTTATTAA TTGAAAAATA CTCATTATCA AGCAAGCGAA ATGTTCTTTG TTTTAAATC
AATATTTTTT TTAAAAAAAT CCAATTTAAA TTTTATCGCT TGCTGAAGAT G

```

SEQ ID NO. 31: Amino acid sequence of β -1,3-galactosyl transferase from *C. jejuni* O:10

```

MFKISII LPT YNVEQYIARA IESCINQTFK NIEIIVDDC GSDKSIDIVK EYAKKDDRI
KIIHNEENLK LLRARYEGVK VANSPIYIMFL DPDDYLELNA CEECMKILKN NEIDLFFFN
AFVLENNNKI ERKLNFOQEC YVKKDFLKL LKTKNLFWTV WAKVIKKELY LKAVGLISL
ENAKINMAED VLLYYPLINI SNTIFHL SKN LYNQINNF S ITKTLTLQNI KTNIQEQDN
VLYLLKKMQY NYNFNLTLLK LIEYFLLIEK YSLSSKRNVL CFKINIFFKK IQPKFYRLLK M

```

SEQ ID NO: 32. Amino acid sequence of lipid A biosynthesis acyltransferase (*C. jejuni* OH4384).

```

1 MKNSDRIYLS LYYILKFFVT FMPDCILHFL ALIVARIAFH LNKKHRKIIN
51 TNLQICFPQY TQKERDKLSL KIYENFAQFG IDCLQNQNTT KEKILNKVNF
101 INENFLIDAL ALKRPIIFTT AHYGNWEILS LAYAAKYGAI SIVGKKLKSE
151 VMYEILSQSR TQFDIELIDK KGGIRQMLSA LKKERALGIL TDQDCVENES
201 VRLKFFNKEV NYQMGASLIA QRSNALIIPV YAYKEGGKFC IEFFKAKDSQ
251 NASLEELTLY QAQSCEEMIK KRPWEYFFFH RRFASYNEEI YKGAK

```

SEQ ID NO: 33. Amino acid sequence of glycosyltransferase encoded by ORF 3a of *C. jejuni* OH4384 *LOS* locus.

```

1 MNLKQISVII IVKNAEQTLL ECLNSLKDFD EIILLNNESS DNTLKIANEF
51 KKDFANLYIY HNAFIGFGAL KNLALSYAKN DWILSIDADE VLENECIKEL
101 KNLKLQEDNI IALSRKNLYK GEWIKACGWW PDYVLRIFNK NFTRFNDNLV
151 HESLVLPSNA KKIYLNKGLK HYSYKDISHL IDKMQYYSSL WAKQNIHKKS
201 GVLKANLRAF WTTFRNYFLK NGFLYGYKGF IISVCSALGT FFKYMKLYEL
251 QRQKPKTCAL IITYNQKER LKLVLD SVKN LAFLPNEVLI ADDGSKEDTA
301 RLIEEYQKDF PCPLKHIWQE DEGFKLSKSR NKTIKNADSE YIIVIDGDMI
351 LEKDFIKEHL EFAQRKLFLQ GSRVILNKKE SEEILNKDDY RIIFNKKDKF
401 SSKNSFLAKI FYSLSKKR

```

SEQ ID NO: 34. Amino acid sequence of glycosyltransferase encoded by ORF 4a of *C. jejuni* OH4384 *LOS* locus.

```

1  MKKIGVVIPI  YNVEKYLREC  LDSVINQTYT  NLEIILVNDG  STDEHSLNIA
51  KEYTLKDKRI  TLFDKKNGL  SSARNIGIEY  FSGEYKLKNK  TQHIKENSIL
101 EFQLDGNPNY  NIYKAYKSSQ  AFNNEKDLTN  FTYPSIDYII  FLDSNDYWKL
151 NCIEECVIRM  KNVDVLWFDH  DCTYEDNIK  KHKKTRMEIF  DFKKECIITP
201 KEYANRALSV  GSRDISFGWN  GMIDFNFLKQ  IKLKFINFII  NEDIHFGIIL
251 FASANKIYVL  SQKLYLCRLR  ANSISNHDKK  ITKANVSEYF  KDIYETFGEN
301 AKEAKNYLKA  ASRVITALKL  IEFKDKQKNE  NALAIKETFL  PCYAKKALMI
351 KKFKKDPLNL  KEQLVLIKPF  IQTKLPYDIW  KFWQKIKNI

```

SEQ ID NO: 35. Amino acid sequence of sialic acid synthase encoded by ORF 8a of *C. jejuni* OH4384 *LOS* locus.

```

1  MKEIKIQNII  ISEEKAPLVV  PEIGINHNG  SLELAKIMVD  AAFSTGAKII
51  KHQTHIVEDE  MSKAAKKVIP  GNAKISIEY  MQKCALDYKD  ELALKEYTEK
101 LGLVYLSTPF  SRAGANRLED  MGVSFAKIGS  GECNNYPLIK  HIAAFKKPMI
151 VSTGMNSIES  IKPTVKILLD  NEIPFVLMHT  TNLYPTPHNL  VRLNAMLELK
201 KEFSCMVGLS  DHTTDNLACL  GAVALGACVL  ERHFTDSMHR  SGPDIVCSMD
251 TQALKELIIQ  SEQMAIMRGN  NESKKAQKE  QVTIDFAFAS  VVSIKDIKKG
301 EVLSMDNIWV  KRPGLGGISA  AEFENILGKK  ALRDIENDTQ  LSYEDFA

```

SEQ ID NO: 36. Amino acid sequence of enzyme involved in sialic acid biosynthesis encoded by ORF 9a of *C. jejuni* OH4384 *LOS* locus.

```

1  MYRVQNSSEF  ELYIFATGMH  LSKNFGYTVK  ELYKNGFKNI  YEFINYDKYF
51  STDKALATTI  DGFSRYVNEL  KPDLIVVHGD  RIEPLAAAI  GALNNILVAH
101 IEGGEISGTI  DDSLRHAISK  LAHIHLVNDE  FAKRRLMQLG  EDEKSIFIIG
151 SPDLELLNDN  KISLNEAKKY  YDINYENYAL  LMFHPVTTEI  TSIKNQADNL
201 VKALIQSNKN  YIVYIPNNDL  GFELILQSYE  ELKNNPRFKL  FPSLRFEYFI
251 TLLKNADFII  GNSSCILKEA  LYLKTAGILV  GSRQNGRLGN  ENTLKVNANS
301 DEILKAINTI  HKKQDLFSK  LEILDSSKLF  FEYLSGGEFF  KLNTQKVFKD
351 IK

```

SEQ ID NO: 37. Amino acid sequence of CMP-sialic acid synthetase encoded by ORF 10a of *C. jejuni* OH4384 *LOS* locus.

```

1  MSLAIIPARG  GSKGIKNKNL  VLLNNKPLIY  YTIKAALNTK  SISKVVVSSD
51  SDEILNYAKS  QNVDILKRPI  SLAQDNTTSD  KVLLHALKFY  KDYEDVVFLQ
101 PTSPLRTNIH  IDEAFNLYKN  SNANALISVS  ECDNKILKAF  VCNEYGDLAG
151 ICNDEYPFMP  RQKLPKTYMS  NGAIYILKIK  EFLNNPSFLQ  SKTKHFLMDE
201 SSSLDIDCLE  DLKKAQEIWK  K

```

SEQ ID NO: 38. Amino acid sequence of acetyltransferase encoded by ORF 11a of *C. jejuni* OH4384 *LOS* locus.

```

1  MEKITLKCNC  NILNLLKQYN  IYTKTYIENP  RRFSLKTKD  FITFPLENNQ
51  LESVAGLGIE  EYCAFKFSNI  LHEMDSFSFS  GSFLPHYTKV  GRYCSISDGV

```

101 SMFNFQHPMD RISTASFTYE TNHSFINDAC QNHINKTFPI VNHNPPSSIT
 151 HLIIQDDVWI GKDVLLKQGI TLGTGCVIGQ RAVVTKDVPP YAIVAGIPAK
 201 IIKYRFDEKT IERLLKIQWW KYHFADFYDI DLNLKINQYL DLLEEKIICK
 251 SISYYPNPKL YFRDILELKS KKIFNLF

SEQ ID NO: 39. Amino acid sequence of glycosyltransferase encoded by ORF 12a of *C. jejuni* OH4384 *LOS* locus.

1 MPQLSIIIPL FNSCDFISRA LQSCINQTLK DIEILIIDDK SKDNSLNMVL
 51 EFAKKDPRIK IFQNEENLGT FASRNLGVLH SSSDFIMFLD SDDFLTPDAC
 101 EIAFKEMKKG FDLLCFDAFV HRVKTQFYR FKQDEVFNQK EFLEFLSKQR
 151 HFCWSVWAKC FKKDIILKSF EKI KIDERLN YGEDVLFCYI YFMFCEKIAV
 201 FKTCIYHYEF NPNGRYENKN KEILNQNYHD KKKSNEIICK LSKEFAHDEF
 251 HQKLFEVLRK EEAGVKNRLK